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Tseng

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(54) **BORE-VARIABLE LEADPIPE FOR BRASS INSTRUMENTS**

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G10D 9/02 (2006.01)

(52) **U.S. Cl.**
CPC ***G10D 9/02*** (2013.01)

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USPC ..... 84/380 R, 387 R, 387 A
See application file for complete search history.

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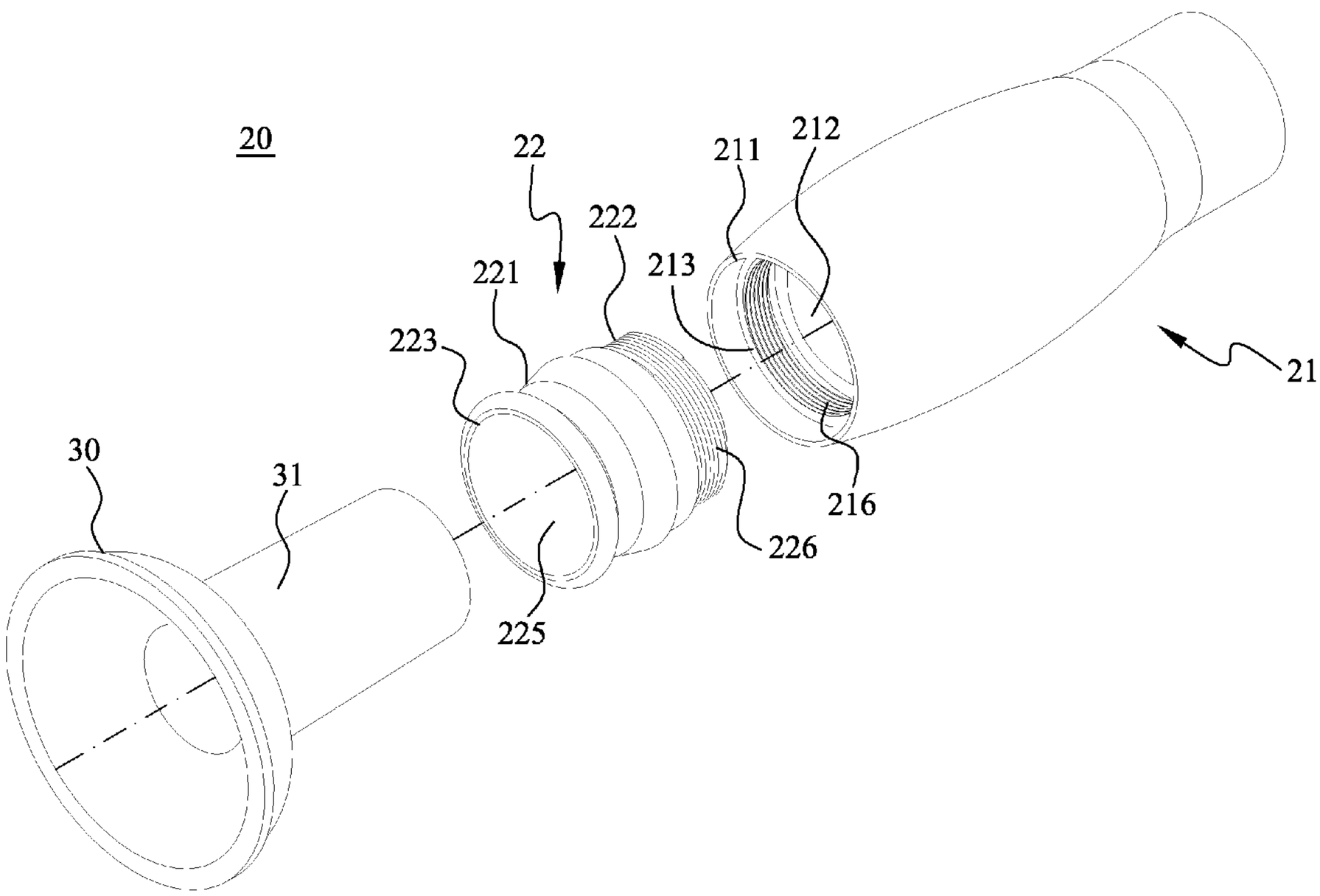
(57) **ABSTRACT**

A bore-variable leadpipe includes a mouthpiece receiver integrally formed on a tube body of a brass instrument and a mouthpiece adaptor detachably assembled to the mouthpiece receiver. The mouthpiece receiver internally defines a first bore, in which an assembling section, a tapered section and an air-guiding section are sequentially formed. The mouthpiece adaptor has a receiving end for receiving a mouthpiece therein and an assembling end for engaging with the assembling section, and internally defines a second bore between the two ends. When the mouthpiece adaptor is assembled to the mouthpiece receiver, the second and the first bore are aligned and communicable with each other to form a conical passage and a cylindrical passage. The leadpipe can be changed in its bore size by assembling a mouthpiece adaptor of a different bore size to the mouthpiece receiver, so that the same brass instrument can be used with differently sized mouthpieces.

8 Claims, 8 Drawing Sheets



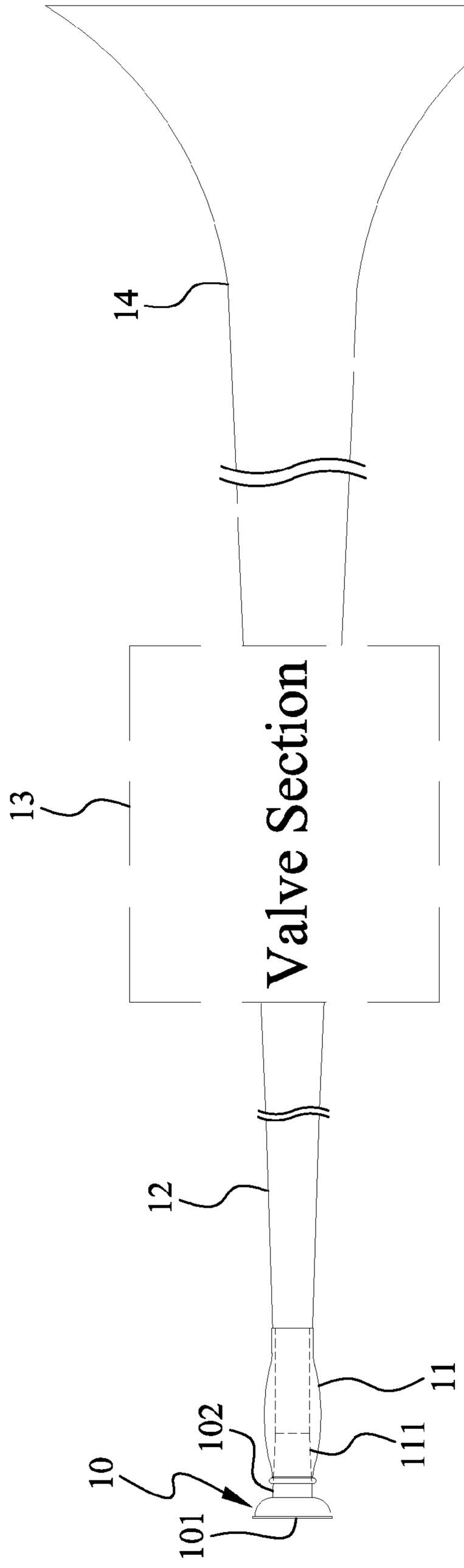


FIG. 1
(Prior Art)

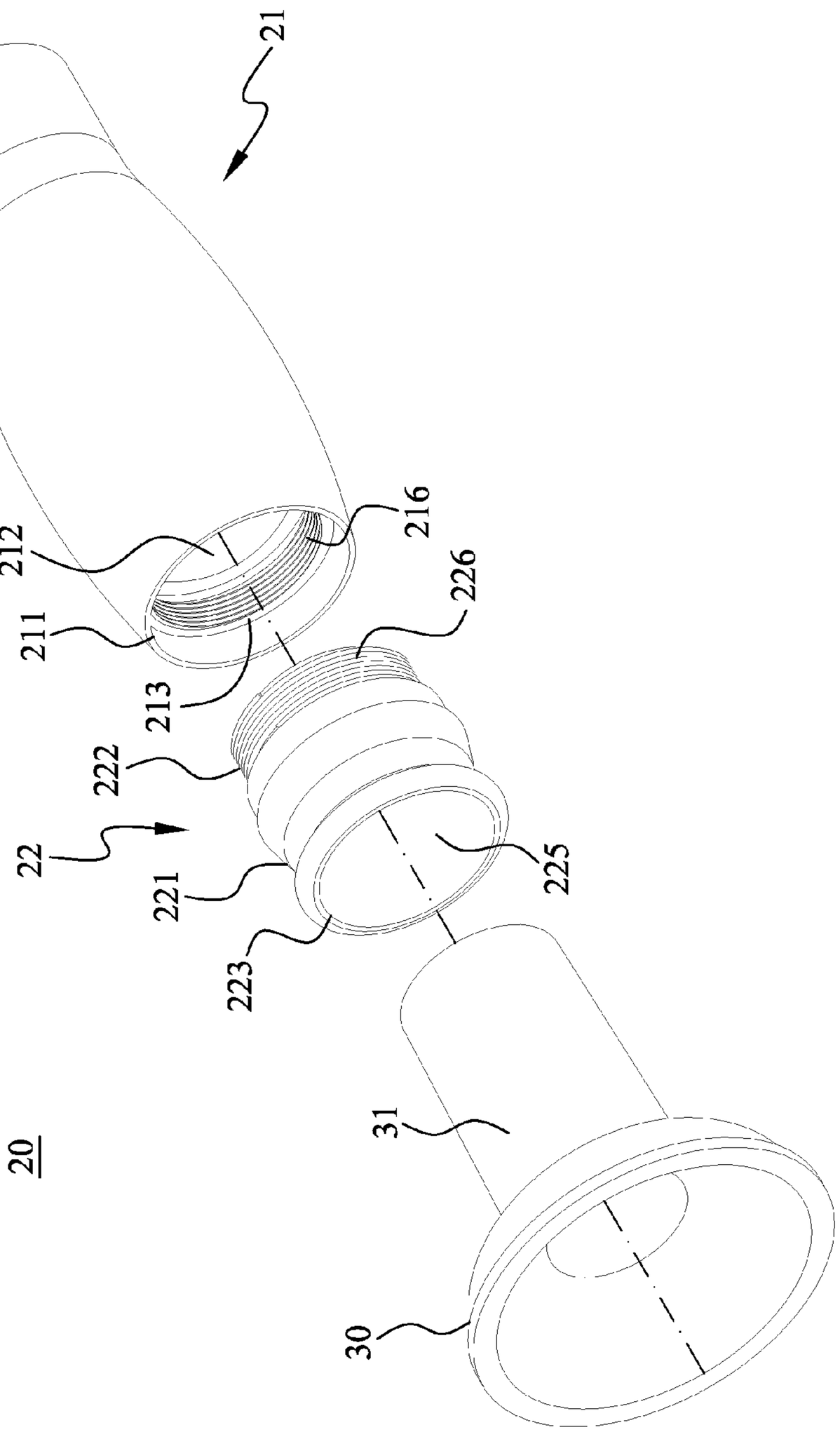


FIG. 2

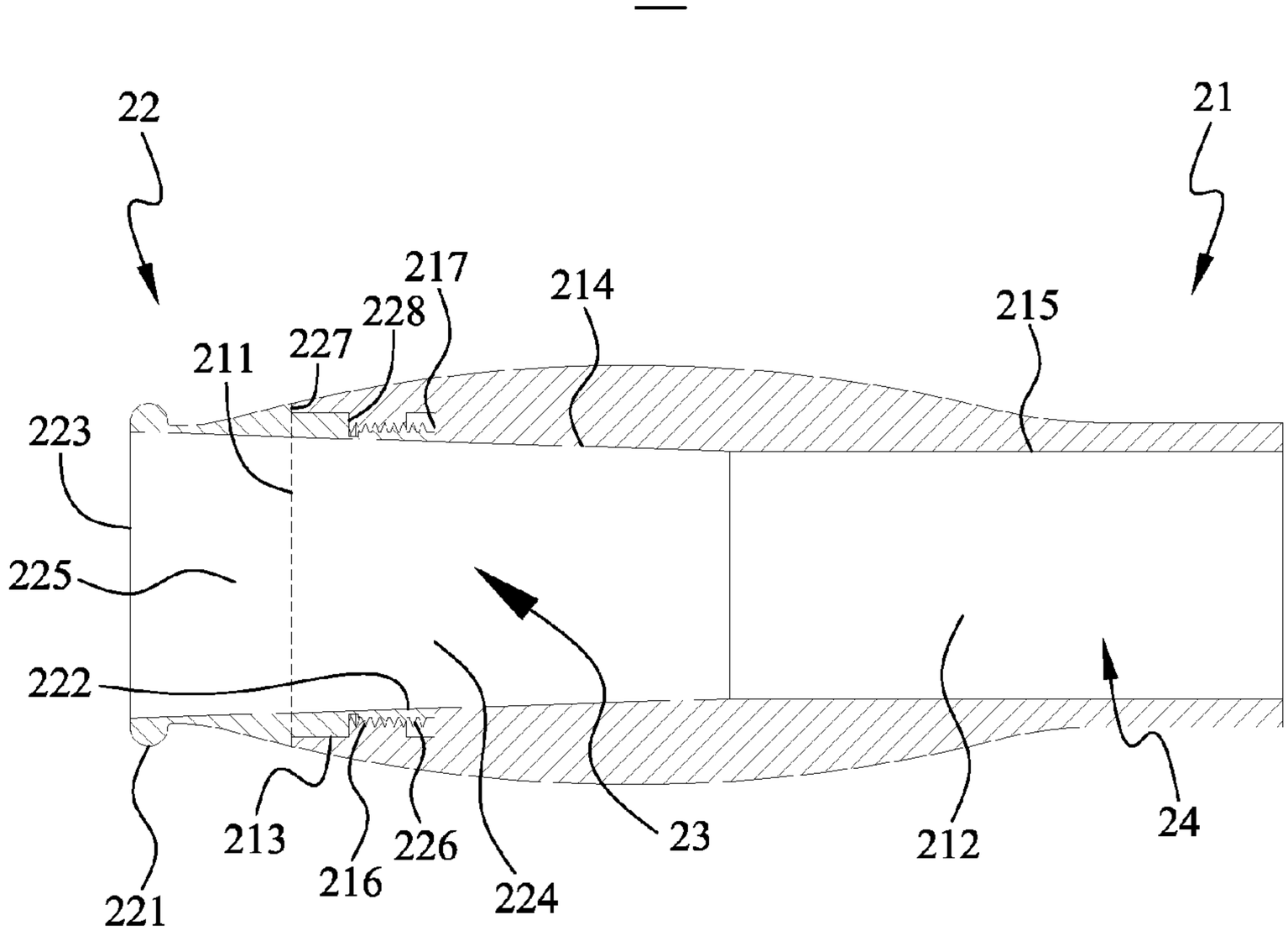

20
22
21
217
214
228
227
215
211
223
225
222
213
216
226
224
23
212
24
221

FIG. 3

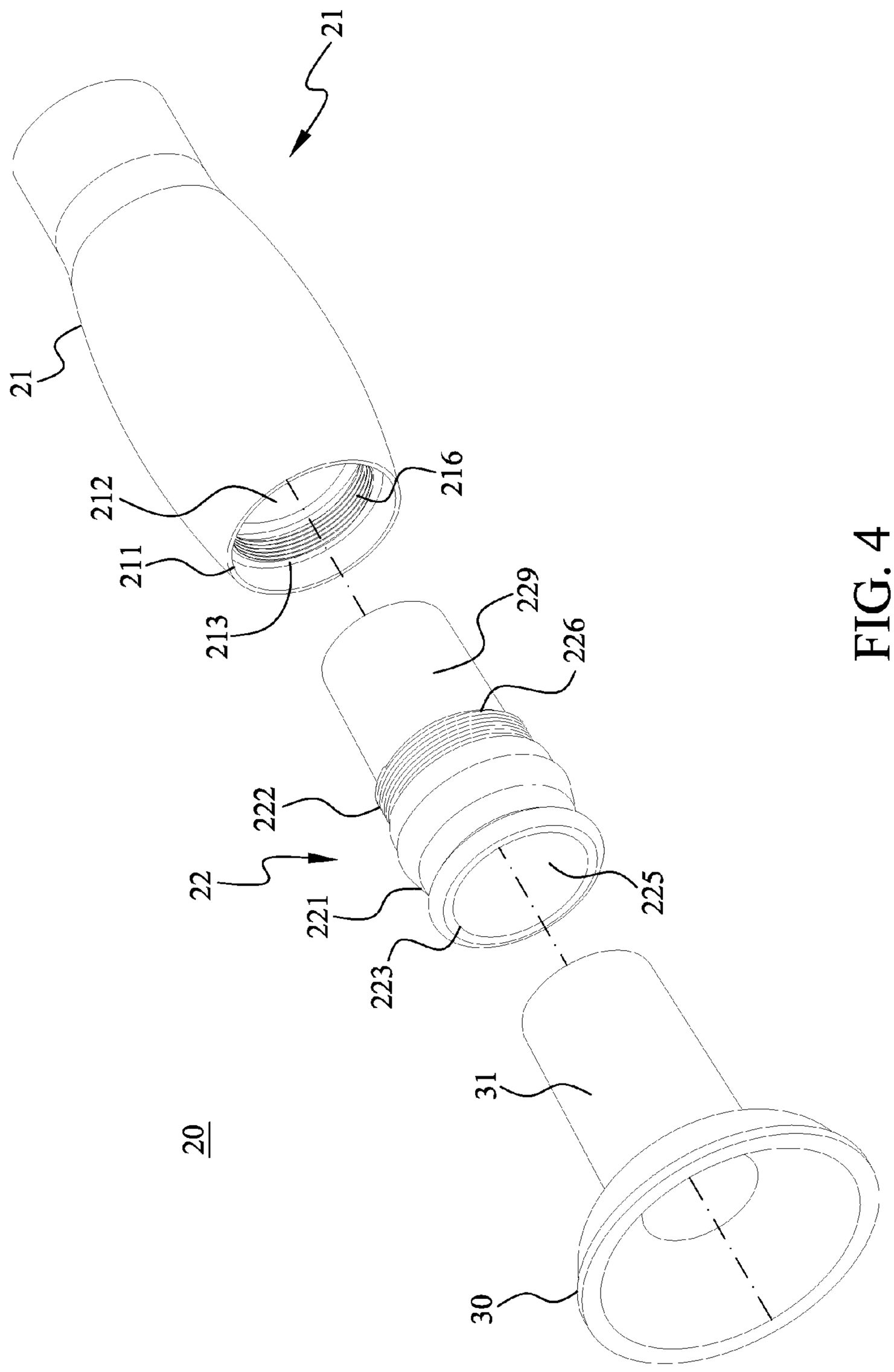


FIG. 4

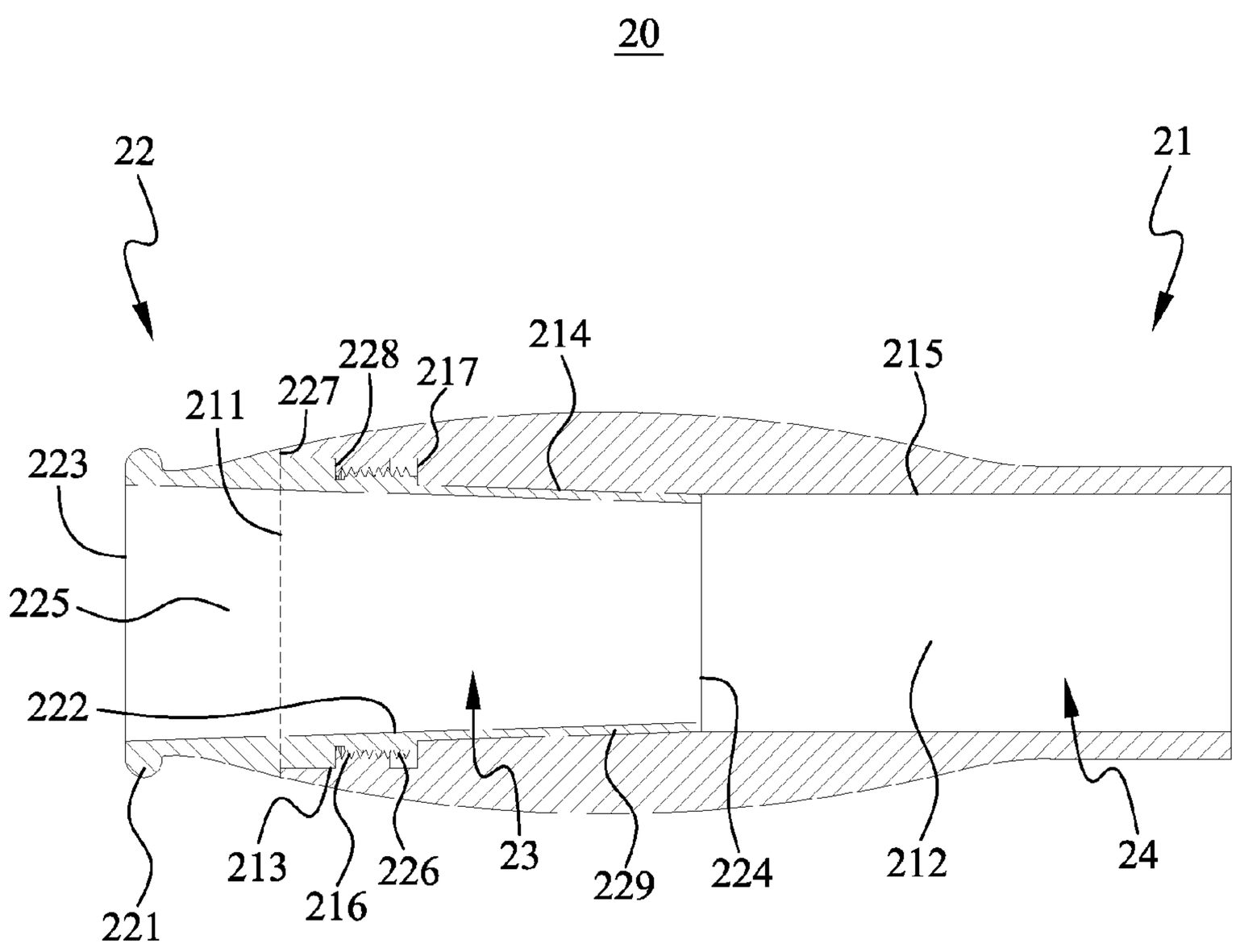

20
22
21
228
227
217
214
215
211
223
225
222
213
216
226
23
229
224
212
24
221

FIG. 5

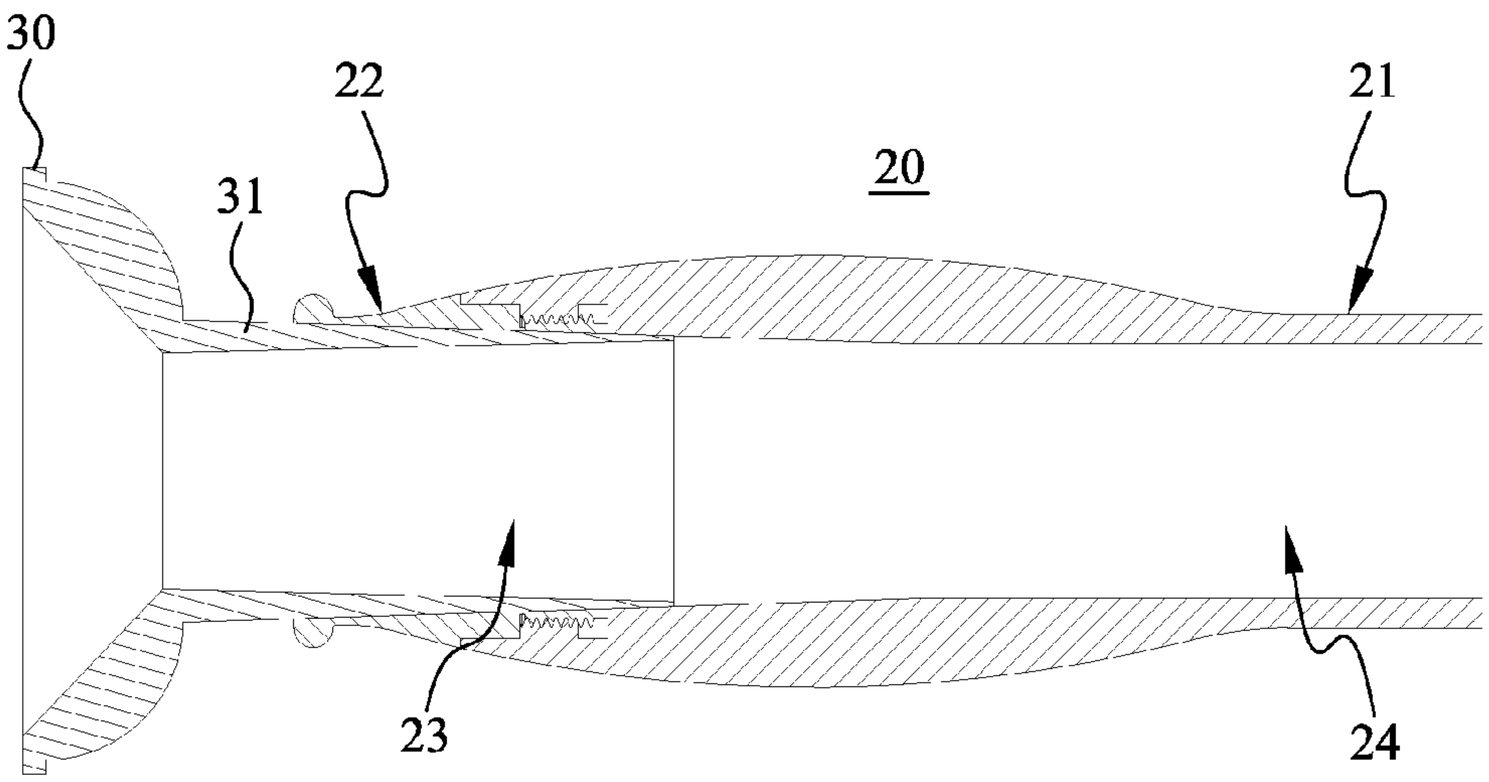


FIG. 6A

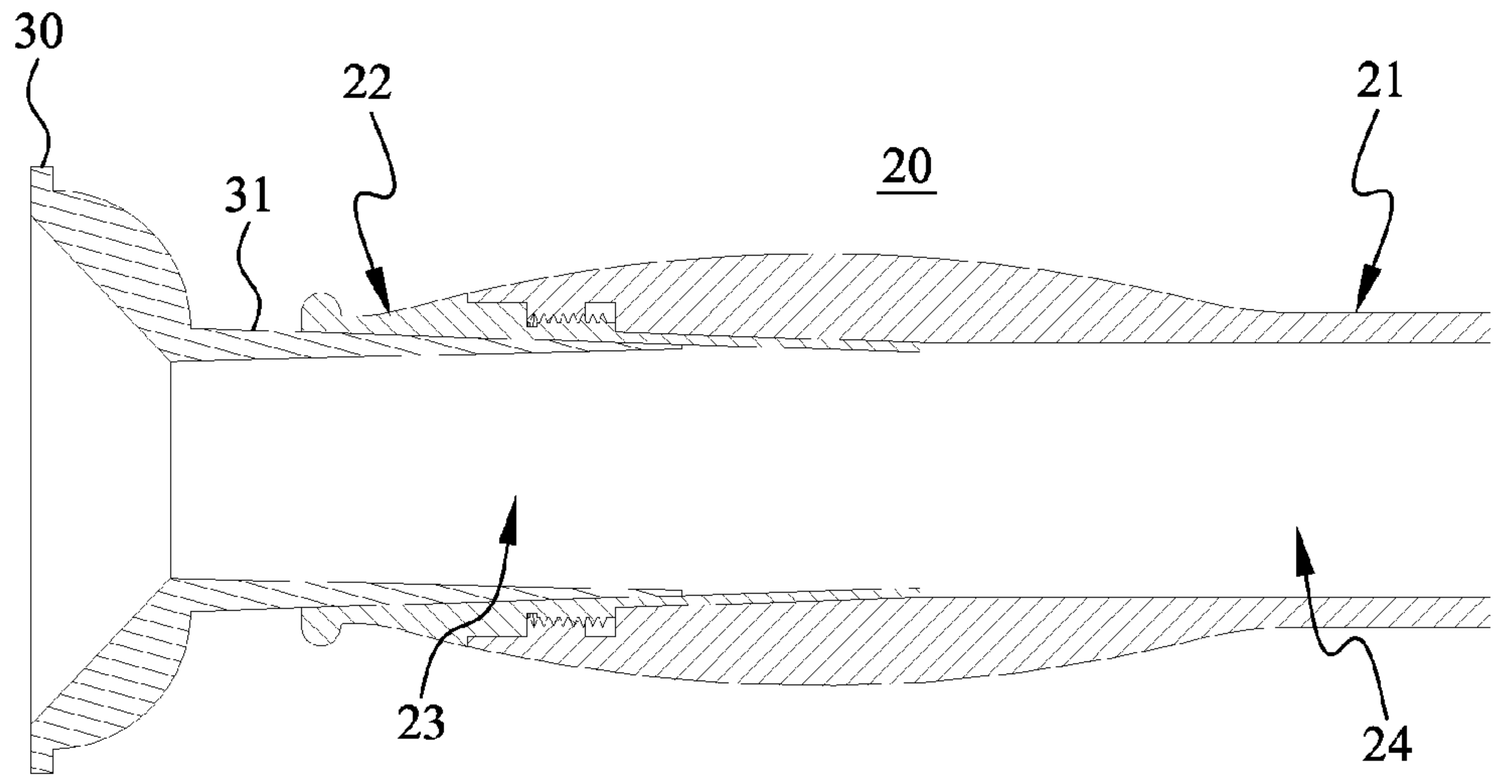


FIG. 6B

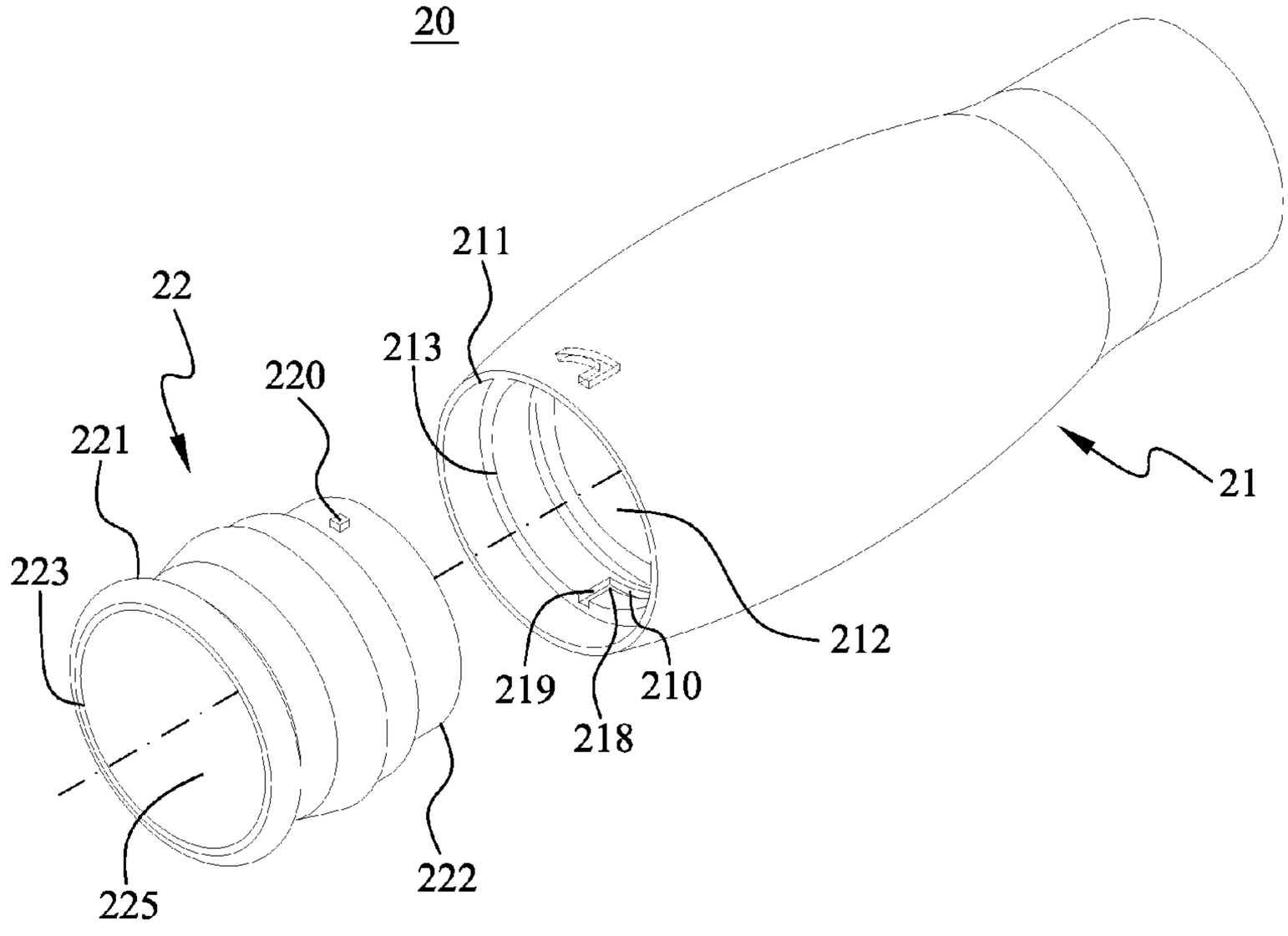


FIG. 7

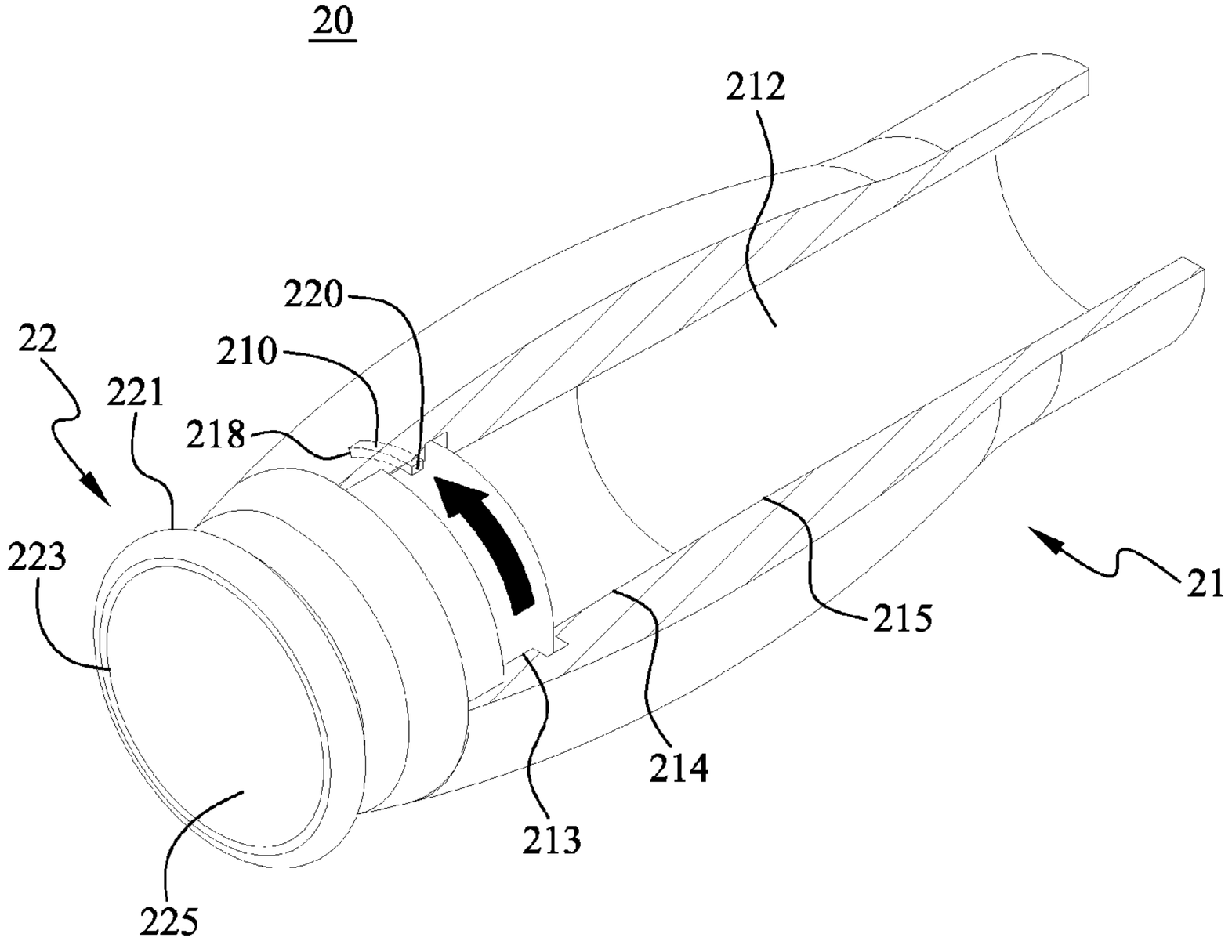


FIG. 8

BORE-VARIABLE LEADPIPE FOR BRASS INSTRUMENTS

FIELD OF THE INVENTION

The present invention relates to a leadpipe for brass instruments, and more particularly to a bore-variable leadpipe that can be quickly disassembled and assembled again to change a bore size thereof, so that mouthpieces of different sizes for euphonium, baritone and so on can be used with the same type of brass instrument via the bore-variable leadpipe.

BACKGROUND OF THE INVENTION

Wind instruments are musical instruments that include a hollow tube body serving as a resonator. According to different sounding principles thereof, the wind instruments are divided into two major types, namely, brass instruments and woodwind instruments. A brass instrument produces sound when a player blows into a mouthpiece set at the end of the resonator to vibrate a column of air in the resonator. Some very common brass instruments include trumpets, French horns, trombones, euphoniums and baritones.

Please refer to FIG. **1**. Any type of brass instrument generally includes a mouthpiece **10**, a leadpipe **11**, a mouthpipe **12**, a valve section **13** and a bell **14**. The mouthpiece **10** includes a funnel-shaped or bowl-shaped cup **101** and a tapered shank **102** extended into the leadpipe **11**. The valve section **13** is located between the mouthpipe **12** and the bell **14** and generally includes three to six valves. In most cases, three or four valves are arranged in the valve section **13**.

Conventionally, the leadpipe **11** for a brass instrument has an opening formed into a conical bore **111**, a size of which is depending on the type of the musical instrument and is usually fixed for receiving a correspondingly sized shank **102** therein. Therefore, to play different brass instruments, a brass player has to own not only a number of brass instruments, but also a number of differently sized mouthpieces **10** to produce sound.

This means the brass player has to purchase different types of brass instrument as well as differently sized mouthpieces, and the cost thereof doubtlessly forms a considerable burden to the brass player. Some brass instruments have a leadpipe bore that can only receive a small-size mouthpiece. For a brass player who prefers to a large-size mouthpiece for playing the brass instruments, the use of a mouthpiece having the player's preferred size to play different brass instruments without being limited to the mouthpiece sizes specific to individual brass instruments would no doubt help the player to get adapted to different brass instruments more quickly.

In view that the conventional brass instruments respectively have a leadpipe that can be used with only one type of mouthpiece, it is desirable to develop a bore-variable leadpipe to allow easy change of the bore size of the leadpipe of a brass instrument, so as to overcome the drawback in the conventional leadpipe.

SUMMARY OF THE INVENTION

A primary object of the present invention is to provide a bore-variable leadpipe for brass instruments, so that any type of brass instrument can be played with a differently sized mouthpiece that is originally designed for a different type of brass instrument, such as euphonium or baritone.

Another object of the present invention is to provide a bore-variable leadpipe, of which the design concept can be applied to any type of brass instrument, allowing a brass player to play different types of brass instruments with the same one mouthpiece and making the brass instruments more convenient to play.

A further object of the present invention is to provide a two-part leadpipe that includes a fixed mouthpiece receiver and a changeable mouthpiece adaptor, allowing a brass player to easily change the bore size of the leadpipe by assembling a mouthpiece adaptor having a required bore size to the mouthpiece receiver and therefore making the brass instruments more convenient for use.

To achieve the above and other objects, the bore-variable leadpipe according to the present invention is connected to a brass instrument and allows a mouthpiece to fit therein, and includes a mouthpiece receiver and a mouthpiece adaptor that are detachably assembled to each other.

According to a first embodiment of the bore-variable leadpipe of the present invention, the mouthpiece receiver is integrally formed on a tube body of the brass instrument and internally defines a first bore that extends from a first opening of the mouthpiece receiver toward the tube body of the brass instrument. And, an assembling section, a tapered section and an air-guiding section are sequentially formed in the first bore starting from the first opening.

In the first embodiment, the mouthpiece adaptor of the bore-variable leadpipe has a receiving end, through which the mouthpiece is extended into the mouthpiece adaptor, and an assembling end for extending into the first bore to engage with the assembling section and thereby assembling the mouthpiece adaptor to the mouthpiece receiver. The receiving end and the assembling end define a second opening and a third opening, respectively; and the mouthpiece adaptor internally defines a second bore that communicates the second opening with the third opening.

The second bore and the first bore are aligned and communicable with each other when the mouthpiece adaptor is assembled to the mouthpiece receiver, and thereby together form a conical passage, in which the mouthpiece is fitted, and a cylindrical passage, via which air is guided to the tube body of the brass instrument. In the first embodiment, a size of the second bore at the third opening is the same as that of the first bore at the tapered section; and the mouthpiece is fixedly fitted in the conical passage formed by the aligned first bore and second bore.

According to a second embodiment of the bore-variable leadpipe of the present invention, the mouthpiece receiver is structurally identical to that in the first embodiment, and the mouthpiece adaptor also has a receiving end, through which the mouthpiece is extended into the mouthpiece adaptor, and an assembling end for extending into the first bore. However, the mouthpiece adaptor in the second embodiment further includes an extended tube portion outward extended from the assembling end for changing the size of the second bore at the third opening. And, the extended tube portion has an outer surface fitly contacting with an inner surface of the tapered section when the mouthpiece adaptor is extended into the first bore.

The second bore and the first bore are aligned and communicable with each other when the mouthpiece adaptor is assembled to the mouthpiece receiver, and thereby form a conical passage, in which the mouthpiece is fitted, and a cylindrical passage, via which air is guided to the tube body of the brass instrument. In the second embodiment, the size of the second bore at the third opening is the same as that of the first bore at the air-guiding section; and the mouthpiece is fixedly fitted in the conical passage that is formed by the second bore alone.

In both of the first and second embodiments, the mouthpiece receiver further internally includes a shoulder portion formed on around a junction between the assembling section and the tapered section, and the mouthpiece adaptor includes at least one shoulder portion formed on around an outer surface of the mouthpiece adaptor between the receiving end and the assembling end; further, the assembling end of the mouthpiece adaptor and the assembling section of the mouthpiece receiver can be connected to each other in different manners, including but not limited to the engagement of male threads or at least one slide block formed on the assembling end with female threads or at least one guide groove formed in the assembling section.

The bore-variable leadpipe of the present invention is characterized by including a fixed mouthpiece receiver integrally formed on the tube body of a brass instrument and a changeable mouthpiece adaptor detachably assembled to the mouthpiece receiver. Therefore, a brass instrument player may change the bore size of the leadpipe by assembling a mouthpiece adaptor having a desired bore size to the mouthpiece receiver, and mouthpieces of different sizes can be used with the same brass instrument via the bore-variable leadpipe.

It is noted the design concept of the bore-variable leadpipe of the present invention can be applied to any type of brass instrument. With the bore-variable leadpipe, a brass player can use the same mouthpiece with different brass instruments or use different mouthpieces with the same brass instrument. Moreover, the mouthpiece adaptor of the bore-variable leadpipe of the present invention can be easily disassembled from the mouthpiece receiver and replaced with another one to enable quick change of the bore size of the leadpipe. In this manner, the brass instruments are more convenient for use.

BRIEF DESCRIPTION OF THE DRAWINGS

The structure and the technical means adopted by the present invention to achieve the above and other objects can be best understood by referring to the following detailed description of the preferred embodiments and the accompanying drawings, wherein

FIG. **1** is a schematic view showing the manner of fitting a mouthpiece in a leadpipe of a brass instrument;

FIG. **2** is an exploded perspective view of a bore-variable leadpipe for brass instruments according to a first preferred embodiment of the present invention;

FIG. **3** is an assembled sectional view of FIG. **2**;

FIG. **4** is an exploded perspective view of a bore-variable leadpipe for brass instruments according to a second preferred embodiment of the present invention;

FIG. **5** is an assembled sectional view of FIG. **4**;

FIGS. **6**A and **6**B show the fitting of two differently sized mouthpieces in the leadpipes according to the first and the second preferred embodiment of the present invention;

FIG. **7** is an exploded perspective view of a bore-variable leadpipe for brass instruments according to a third preferred embodiment of the present invention; and

FIG. **8** is a cutaway view showing the manner in which two separate parts of the bore-variable leadpipe of FIG. **7** are assembled to each other.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention will now be described with some preferred embodiments thereof and with reference to the accompanying drawings. For the purpose of easy to understand, elements that are the same in the preferred embodiments are denoted by the same reference numerals.

Please refer to FIGS. **2** and **3**, which are exploded perspective and assembled sectional views, respectively, of a bore-variable leadpipe for brass instruments according to a first preferred embodiment of the present invention. For the purpose of conciseness and clarity, the present invention is also briefly referred to as the bore-variable leadpipe and generally denoted by reference numeral **20** herein. As shown, in the first preferred embodiment, the bore-variable leadpipe **20** includes a mouthpiece receiver **21** connected to a brass instrument (not shown) and a mouthpiece adaptor **22** detachably assembled to the mouthpiece receiver **21**. In the mouthpiece adaptor **22**, a mouthpiece **30** is removably fitted for a br5ass player to play the brass instrument and produce sound. Since the technical structures of the brass instrument and the mouthpiece **30** are known in the art, they are not discussed in detail herein.

The mouthpiece receiver **21** is integrally welded to the brass instrument's tube body (not shown but generally corresponding to the mouthpipe **12** shown in FIG. **1**), and has a first opening **211**. The mouthpiece receiver **21** internally defines a first bore **212**, which extends from the first opening **211** toward the tube body of the brass instrument. In the first bore **212**, starting from the first opening **211**, an assembling section **213**, a tapered section **214** and an air-guiding section **215** are sequentially formed.

In the illustrated first preferred embodiment, the assembling section **213** is internally provided with female threads **216**, the tapered section **214** internally defines a conical space, and the air-guiding section **215** has an inner diameter the same as that of the tube body of the brass instrument. Further, a first shoulder portion **217** is formed in the mouthpiece receiver **21** on around a junction between the assembling section **213** and the tapered section **214**.

The mouthpiece adaptor **22** has a receiving end **221**, through which the mouthpiece **30** is extended into the mouthpiece adaptor **22**, and an opposite assembling end **222** for extending into the first bore **212** of the mouthpiece receiver **21** to engage with the assembling section **213**. The receiving end **221** and the assembling end **222** define a second opening **223** and a third opening **224**, respectively; and the mouthpiece adaptor **22** internally defines a second bore **225**, which communicates the second opening **223** with the third opening **224**.

In the first preferred embodiment, the assembling end **222** is externally provided with male threads **226** for meshing with the female threads **216**, allowing the mouthpiece adaptor **22** to be screwed into and fixedly connected to the mouthpiece receiver **21** with an end surface of the assembling end **222** pressed against the first shoulder portion **217**. Further, a second shoulder portion **227** and a third shoulder portion **228** are formed on around an outer surface of the mouthpiece adaptor **22** between the receiving end **221** and the assembling end **222** to axially space from each other. When the mouthpiece adaptor **22** is screwed into the mouthpiece receiver **21**, the second shoulder portion **227** is pressed against an end surface of the first opening **211** and the third shoulder portion **228** is pressed against an end surface of the female threads **216**.

When the mouthpiece adaptor **22** is screwed into the mouthpiece receiver **21**, the outer surfaces of the mouthpiece adaptor **22** and mouthpiece receiver **21** together form a seamless curved surface, and meanwhile, the second bore **225** and the first bore **212** are aligned and communicable with each other to together form a conical passage **23** for fitly receiving the mouthpiece **30** therein as well as a cylindrical passage **24** for guiding air to the tube body of the brass instrument. The size of the second bore **225** at the third opening **224** is the

same as the size of the first bore **212** at the tapered section **214**, so that the aligned second bore **225** and first bore **212** can together form the conical passage **23**.

FIGS. **4** and **5** are exploded perspective and assembled sectional views, respectively, of a bore-variable leadpipe **20** according to a second preferred embodiment of the present invention. As shown, the mouthpiece receiver **21** in the second preferred embodiment is structurally identical to that in the first preferred embodiment and is therefore not repeatedly described herein. The mouthpiece adaptor **22** in the second preferred embodiment also has a receiving end **221**, through which the mouthpiece **30** is extended into the mouthpiece adaptor **22**, and an assembling end **222** for extending into the first bore **212**. The two ends **221**, **222** have detailed structures similar to those in the first preferred embodiment.

However, the assembling end **222** in the second preferred embodiment further includes an extended tube portion **229**, which is outward extended from the assembling end **222** for changing the size of the second bore **225** at the third opening **224**. When the mouthpiece adaptor **22** is extended into the mouthpiece receiver **21**, the extended tube portion **229** has an outer surface fitly contacting with an inner surface of the tapered section **214**. The size of the third opening **224** can be changed by increasing or decreasing the length or the thickness of the extended tube portion **229**.

According to the second preferred embodiment, when the mouthpiece adaptor **22** is assembled to the mouthpiece receiver **21**, the second bore **225** and the first bore **212** are also communicable with each other to form a conical passage **23** for fitly receiving the mouthpiece **30** therein and a cylindrical passage **24** for guiding air to the tube body of the brass instrument. The size of the second bore **225** at the third opening **224** is the same as that of the first bore **212** at the air-guiding section **215**.

Please refer to FIG. **6**A. Since the mouthpiece **30** for an euphonium has a shank **31** larger than that of a mouthpiece for a baritone, the brass player may use the mouthpiece adaptor **22** according to the first preferred embodiment of the present invention on a brass instrument for fitting a larger mouthpiece **30**, which is originally designed for an euphonium, in the conical passage **23** formed by the first bore **212** and the second bore **225**.

On the other hand, as shown in FIG. **6**B, since the mouthpiece **30** for a baritone has a shank **31** smaller than that of a mouthpiece for an euphonium, the brass player may use the mouthpiece adaptor **22** according to the second preferred embodiment of the present invention on a brass instrument for fitting a smaller mouthpiece **30**, which is originally designed for a baritone, in the conical passage **23** that is formed by the second bore **225** alone and has a reduced size.

While the use of the bore-variable leadpipe **20** of the present invention has been described with the mouthpieces for an euphonium and an baritone as shown in FIGS. **6**A and **6**B, it is understood the above description is illustrative and non-limiting, and the same design concept of the present invention can be applied to many other types of brass instrument for changing the bore size of the leadpipe **20**. With the bore-variable leadpipe **20** according to the present invention, mouthpieces **30** of different sizes can be used with the same brass instrument. In this manner, the brass instruments are more convenient for use.

FIGS. **7** and **8** are exploded perspective and cutaway views, respectively, of a bore-variable leadpipe **20** according to a third preferred embodiment of the present invention. As shown, the third preferred embodiment is generally structurally similar to the first preferred embodiment, except that, in the third preferred embodiment, the assembling section **213** of the mouthpiece receiver **21** is internally provided with at least one guide groove **218**, which includes a guide section **219** and a retaining section **210**, and the assembling end **222** of the mouthpiece adaptor **22** is externally provided with at least one slide block **220** corresponding to the guide groove **218**.

According to the third preferred embodiment, the mouthpiece adaptor **22** is assembled to the mouthpiece receiver **21** by aligning the slide block **220** with the guide section **219**, moving the slide block **220** all the way to the bottom of the guide section **219**, and turning the mouthpiece adaptor **22** for the slide block **220** to locate in the retaining section **210**. In this manner, the mouthpiece adaptor **22** can be easily assembled and held to the mouthpiece receiver **21**.

From the above-described three preferred embodiments of the present invention, it is understood many different connection means other than screw threads can be used between the assembling end **222** of the mouthpiece adaptor **22** and the assembling section **213** of the mouthpiece receiver **21** to assemble the mouthpiece adaptor **22** to the mouthpiece receiver **21**. Therefore, while the present invention has been described with some preferred embodiments thereof, it is understood that many changes and modifications in the described embodiments can be carried out without departing from the scope and the spirit of the invention that is intended to be limited only by the appended claims.

What is claimed is:

1. A bore-variable leadpipe for brass instruments, comprising:

a mouthpiece receiver being integrally formed on a tube body of a brass instrument and having a first opening; the mouthpiece receiver internally defining a first bore extending from the first opening toward the tube body; and an assembling section, a tapered section and an air-guiding section being sequentially formed in the first bore starting from the first opening; and

a mouthpiece adaptor having a receiving end, through which a mouthpiece is extended into the mouthpiece adaptor, and an assembling end for extending into the first bore to engage with the assembling section and thereby assembling the mouthpiece adaptor to the mouthpiece receiver; the receiving end and the assembling end defining a second opening and a third opening, respectively; and the mouthpiece adaptor internally defining a second bore that communicates the second opening with the third opening; and

the second bore and the first bore being aligned and communicable with each other when the mouthpiece adaptor is assembled to the mouthpiece receiver, and thereby forming a conical passage, in which the mouthpiece is fitted, and a cylindrical passage, via which air is guided to the tube body of the brass instrument.

2. The bore-variable leadpipe as claimed in claim **1**, wherein a size of the second bore at the third opening is the same as that of the first bore at the tapered section; and wherein the mouthpiece is fixedly fitted in the conical passage that is formed by the aligned first bore and second bore.

3. The bore-variable leadpipe as claimed in claim **1**, wherein the assembling end of the mouthpiece adaptor further includes an extended tube portion for changing a size of the second bore at the third opening, and the extended tube portion having an outer surface fitly contacting with an inner surface of the tapered section when the mouthpiece adaptor is extended into the first bore.

4. The bore-variable leadpipe as claimed in claim **3**, wherein the size of the second bore at the third opening is the same as that of the first bore at the air-guiding section; and

wherein the mouthpiece is fixedly fitted in the conical passage that is formed by the second bore alone.

5. The bore-variable leadpipe as claimed in claim **1**, wherein the mouthpiece receiver further internally includes a shoulder portion formed on around a junction between the assembling section and the tapered section.

6. The bore-variable leadpipe as claimed in claim **1**, wherein the mouthpiece adaptor includes at least one shoulder portion formed on around an outer surface of the mouthpiece adaptor between the receiving end and the assembling end.

7. The bore-variable leadpipe as claimed in claim **1**, wherein the assembling end of the mouthpiece adaptor is screwed into the assembling section of the mouthpiece receiver.

8. The bore-variable leadpipe as claimed in claim **1**, wherein the assembling end of the mouthpiece adaptor and the assembling section of the mouthpiece receiver are assembled to each other through engagement of at least one slide block with at least one corresponding guide groove.

* * * * *